REMARKS

This application has been carefully reviewed in light of the Office Action dated September 12, 2003. Claims 1, 7-8, 13-14, and 47 have been amended. Claims 2-5 and 15 have been canceled. Claim 48 has been added. Claims 1, 6-14, 16-17, and 46-48 are now pending. A Petition for Extension of Time (two-months) is concurrently filed herewith. Applicants respectfully request reconsideration of the above-referenced application in light of the amendments and following remarks.

Claims 1-4, 6-8 and 10-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over McInerney in view of Fong. The rejection is respectfully traversed.

McInerney and Fong do not teach an atomic layer doping apparatus comprising, *inter alia*, "a first atomic layer doping region . . . said first atomic layer doping region further comprising a heater assembly provided under a susceptor; a second atomic layer doping region . . . said second atomic layer doping region further comprising a heater assembly provided under a susceptor, wherein said first and second atomic layer doping regions are chemically isolated from one another by an inert gas curtain; and a loading assembly," as recited in claim 1.

McInerney does not teach or suggest a first and second atomic layer doping region with a heater assembly provided under a susceptor. McInerney merely discloses pedestals 116, 118 "where wafers are positioned during processing." (Col. 3, lines 58-59). McInerney does not teach or suggest that the pedestals 116, 118 comprise Applicants' claimed heater assembly. Applicants' specification provides that "the apparatus of the present invention allows, for example, reactor chamber 50a to be set to a different temperature than that of the reactor chamber 50b." (Applicants' specification, pg. 16, lines 13-15).

The Office Action relies upon Fong as providing support for teaching a first atomic layer region used for deposition and a second atomic layer region used for driving in the dopant atoms, and adds nothing to rectify the deficiencies associated with

McInerney.

Accordingly, the cited references neither teach or suggest, alone or in combination, the claimed features of Applicants' apparatus. Claims 6-8, 10-14, and 16-17, depend from claim 1 and are allowable along with claim 1. Withdrawal of the § 103(a) rejection of claims 1, 6-8, 10-14, and 16-17 is respectfully solicited.

Claim 9 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over McInerney and Fong and in further view of Henley. The rejection is respectfully traversed and reconsideration is requested.

Dependent claim 9 is allowable for at least those reasons set forth above with respect to independent claim 1. Specifically, McInerney and Fong do not teach or suggest first and second atomic layer doping regions with heater assembly's provided under a susceptor. Henley is relied upon for teaching three deposition regions and adds nothing to correct the deficiencies found in McInerney and Fong. Accordingly, withdrawal of the § 103(a) rejection of claim 9 is respectfully solicited.

Claim 46 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over McInerney in view of Fong and further in view of Gattuso. The rejection is respectfully traversed.

For similar reasons provided above, McInerney and Fong do not teach or suggest an atomic layer doping apparatus comprising "a first atomic layer doping region . . . a second atomic layer doping region, said first and second doping regions being chemically isolated from one another by an inert gas curtain, wherein said inert gas curtain is provided at a higher pressure than said first dopant species; and, a loading assembly," as recited in claim 46.

McInerney and Fong do not teach or suggest a first and second atomic layer doping region separated by an inert gas curtain provided at a higher pressure than the first dopant species. Fong is relied upon for teaching a first atomic layer region used for deposition and a second atomic layer region used for driving in the dopant atoms, and adds nothing to rectify the deficiencies associated with McInerney. Gattuso is further relied upon for teaching use of an inert gas curtain at a higher pressure than the reaction gases.

Applicants respectfully submit that there is no teaching or suggestion in McInerney for an inert gas curtain which is provided at a higher pressure than the first dopant species. In fact, McInerney teaches away from an inert gas curtain provided at a higher pressure than the dopant species. McInerney teaches that "chamber top 206 includes a purge plate 210 that delivers a uniform flow of an inert gas, such as argon, between stations A, B, C, and D." (Col. 8, lines 39-41) (emphasis added). Thus, there is no motivation to combine McInerney and Gattuso when McInerney teaches that the flow of the inert gas is uniform.

As a result, there is no teaching or suggestion in McInerney for an inert gas curtain provided at a higher pressure than the first dopant species. See M.P.E.P. § 2143.01. Accordingly, withdrawal of the § 103(a) rejection is respectfully solicited.

Claim 47 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over McInerney in view of Fong and further in view of Hartig. The rejection is respectfully traversed.

For similar reasons provided above, McInerney and Fong do not teach or suggest "a first atomic layer doping region for depositing a first dopant gas species . . . said first dopant gas species exhausted through a first gas port; a second atomic layer doping region for diffusing said first dopant gas species in said first substrate with a non-reactive gas species, said first and second doping regions being chemically isolated from one another by an inert gas curtain provided at a higher pressure than said first dopant gas species, wherein

said non-reactive gas species is exhausted through a second gas port; and a loading assembly," as recited in claim 47.

McInerney and Fong do not teach or suggest a first atomic doping layer region with a first gas port and a second atomic doping layer region with a second gas port. Moreover, neither reference teaches alone, or in combination, that the first and second atomic doping regions are separated by an inert gas curtain provided at a higher pressure than said first dopant gas species. Hartig is relied upon the use of separate gas exhausts for each chamber.

The Office Action states that the "Examiner disagrees there must be some teaching or suggestion in McInerney to use separate exhaust ports." (Office Action, pg. 9). However, "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." M.P.E.P. §2143.01 (emphasis added). Accordingly, "[a]lthough a prior art device 'may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.'" M.P.E.P. §2143.01 (emphasis added). Here, McInerney merely suggests the use of a single exhaust port for both reaction chambers. McInerney does not teach or suggest multiple exhaust ports for each reaction chamber. Thus, there is no motivation to combine McInerney and Hartig.

New claim 48 has been added and recites, *inter alia*, "a first atomic layer doping region comprising a susceptor and a heater assembly . . . a second atomic layer doping region comprising a susceptor and a heater assembly . . . wherein said first and second atomic layer doping regions are isolated from one another by a physical barrier having a closeable opening; and a loading assembly."

The prior art of record does not teach or suggest this subject matter. There is no teaching or suggestion in McInerney to have a physical barrier having a closeable opening. The Office Action has cited Straemke for teaching a gas tight door separating reaction chambers. However, "[t]he mere fact that references can be combined or

modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." M.P.E.P. § 2143.01 (emphasis added). In this situation, there is no teaching or suggestion for employing a physical barrier having a closeable opening in McInerney.

The reactive gases in McInerney "are drawn down into respective wells 126 and 128, via annular gaps 126a and 128a, and have little opportunity to migrate toward another pedestal." (Col. 5, lines 37-41) (emphasis added). "The narrow annular gaps permit little or no recirculation of the reactive gases once the gases are drawn into the wells." (Col. 2, lines 9-11). Thus, the presence of a physical barrier having a closeable opening nullifies the importance of annular gaps 126a and 128a. Further, the presence of the annular gaps effectively isolate the adjacent chambers. There is no motivation to modify McInerney and obtain Applicants' claimed physical barrier having a closeable opening, in the atomic layer doping apparatus recited in claim 48.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

By_____

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